treated, multi-racial population referred for evaluation of suspected arterial hypertension.

2-D directed M-mode echocardiograms and awake ambulatory blood pressure (BP) monitoring were performed in 37 patients. LV mass (g/m^2) and RWT (sum of septal and posterior wall/LV internal dimension) were assessed in a blinded fashion using the Penn convention. Body mass index (BMI, kg/m^2) was measured. ACE genotype was determined by polymerase chain reaction amplification of DNA prepared from leukocytes using primers that encompass the *alu* repeat sequence. Subjects were divided into two groups based on genotype: group 1 (DD genotype, n = 14,); group 2 (ID or II genotype, n = 23):

	RWT	LV mass	Systolic BP	Age	BMI
Group 1	0.40 ± 0.03*	102 ± 41	151 ± 16	50 ± 11	28 ± 3
Group 2	0.32 ± 0.01	94 ± 21	146 ± 15	45 ± 9	29 ± 5

*$p < 0.03$

RWT was significantly increased (*$p < 0.03$) in patients with the DD genotype (group 1). LV mass, systolic BP, age and BMI did not differ between groups; LVH was present in only 2 patients in each group. In multivariate analysis, after accounting for the effect of age, race, sex and body mass index, concentric remodeling (RWT) and systolic BP were independently related to the DD genotype ($p < 0.003$, and $p < 0.03$, respectively).

Thus the DD genotype may be associated with concentric LV remodeling, a geometric pattern associated with increased cardiovascular risk. Screening for the DD allele may allow early identification of subjects at increased risk for this geometric pattern and future cardiovascular disease.

730 Directional Atherectomy

Tuesday, March 21, 1995, 8:30 a.m.–10:00 a.m.
Ernest N. Morial Convention Center, La Louisiane B

8:30

730-1 Angioscopy Guided Simpson Atherectomy — New Insights into Early Directional Coronary Atherectomy Results

Torsten Thieme, Stefan B. Felix, Rudolf Meyer, Hans Peter Dübel, Volker Gliech, Gert Baumann, Franz X. Kleber. *Medizinische Klinik I, Institut für Pathologie Rudolph Virchow, Charité, Humboldt Universität zu Berlin, Germany*

Restenosis and acute complication rate in angioplasty are closely related to acute angiographic results. Short and longterm outcome after Simpson atherectomy (DCA) has not yet yielded better results than PTCA. We used angioscopy guided atherectomy to further improve atherectomy results and to gain new insights into discrepancies between excellent angiographic results and considerable complication and restenosis rate. 100 DCAs were performed in 97 pts in 63 LAD, 23 RCA, 12 CX, 1 diagonal branch and 1 bypass graft lesions. In 80 pts 83 elective, preplanned procedures and in 17 pts rescue procedures were performed. Initial angiographic success was achieved in 86% with DCA and in 90.4% with DCA plus adjunctive PTCA. Coronary angiography after DCA revealed the large size, smooth contour lumina that are known for this procedure. The table shows results in the elective DCA procedures.

Angiographic results	pre DCA	after DCA	after DCA + PTCA
% diameter stenosis	71.1	25.5	21.1
MLD (mm)	0.91	2.37	2.63

In 63 of these pts DCA was combined with angioscopy before and/or after DCA and adjunctive PTCA in a total of 169 angioscopic procedures. Baxter 4.5-Fr. angioscopy catheters were used. Angioscopy post DCA revealed highly irregular lumina with typical grooves, large protrusions of atherosclerotic material and considerable residual luminal narrowing. The distribution of the grooves into diverse directions of the 360° vessel lumen explains the smooth endoluminal surface found in coronary angiography, which contrasts with the angioscopic results. Post DCA PTCA markedly improves angioscopic results with smoother surface and enlarged lumina. *Conclusions:* Angiographic findings after DCA are misleading. Angioscopically highly irregular surfaces with significant residual stenoses are found. Angioscopy guided atherectomy and PTCA after DCA lead to better results.

8:45

730-2 Acute Angiographic, Intravascular Ultrasound and Clinical Results of Directional Atherectomy in the Optimal Atherectomy Restenosis Study

Martin B. Leon, Richard E. Kuntz, Jeffrey J. Popma, Charles A. Simonton, Tomoaki Hinohara, Gary S. Mintz, Robert M. Bersin, Paul G. Yock, Donald S. Baim. *Washington Hospital Center, Washington, DC*

The Optimal Atherectomy Restenosis Study (OARS) is a 200 patient multicenter (4 sites) registry designed to assess an intravascular ultrasound (IVUS) guided "optimal" directional atherectomy (DCA) on acute angiographic results, in-hospital complications, and late outcomes. At present, preliminary acute results are available for 155 lesions in 146 consecutively treated patients. Baseline patient characteristics were age 58 ± 11 years, male gender 74%, LAD treatment vessel 54%, CCVS angina class III or IV 75%, diabetes 15%, and prior PTCA 23%. Pre-treatment target lesions were 7.9 ± 2.6 mm in length, 63% were eccentric, 13% were ulcerated, and 20% had either moderate or severe calcification. Overall, procedure success (<50% final stenosis without major complications) was achieved in 143 (98%) patients and there were in-hospital major complications in 3 (2.1%) patients including no deaths (0%), Q wave MI in 1 (0.7%), and emergency CABG in 2 (1.4%). Significant angiographic dissections (≥grade C) after DCA were present in 9 (5.9%) patients and bailout stents were used to treat dissections in 4 (2.7%) without subsequent ischemic events. There was 1 perforation (0.7%) treated successfully with PTCA. Quantitative angiography was performed using an automated edge detection algorithm (CMS); reference diameter was 3.23 ± 0.48 mm and pre-treatment minimum lumen diameter (MLD) increased from 1.18 ± 0.44 mm to 2.74 ± 0.69 mm after DCA, and further to 3.14 ± 0.56 mm after adjunct PTCA (performed in 89% of treated lesions). Similarly, diameter stenosis was reduced from 63 ± 12% pre-treatment to 19 ± 19% after DCA to 7 ± 12% after adjunct PTCA. Sequential IVUS revealed an increase in lesion site cross-sectional area from 8.2 mm^2 following DCA to 9.0 mm^2 after adjunct PTCA (proximal reference area 10.5 mm^2). Despite the large final lumen dimensions (14% final cross-sectional area stenosis by IVUS), % cross-sectional narrowing (residual plaque burden) still averaged 57%. *We conclude:* (1) "optimal" DCA can be performed with high procedure success and few major in-hospital complications; (2) adjunct PTCA is usually required to achieve maximum lumen dimensions, and (3) despite these favorable angiographic results, IVUS reveals considerable residual plaque burden (>50%) after "optimal" DCA.

9:00

730-3 "Directional" Coronary Atherectomy Removes Atheroma More Effectively from Concentric than Eccentric Lesions: Intravascular Ultrasound Predictors of Lesional Success

Anthony C. De Franco, E. Murat Tuzcu, David J. Moliterno, Russell E. Raymond, Irving Franco, Skip Guyer, Stephen G. Ellis, Patrick L. Whitlow, Steven E. Nissen. *The Cleveland Clinic, Cleveland, OH*

Objectives: Directional coronary atherectomy (DCA) was developed to remove atheroma from eccentric lesions. Conventional teaching proposes that DCA is most effective for eccentric plaques; however, no data have correlated plaque configuration with atheroma removal.

Methods: We performed intravascular ultrasound and angiography to assess the effect of plaque distribution and morphology on acute lesional success (percentage of plaque removed). We examined 101 target lesions and reference sites in 88 patients pre- and post-atherectomy. A core laboratory, blinded to outcome, classified lesions as concentric if plaque exceeded 0.75 mm in thickness for the entire 360° vessel circumference. Lesions with sparing of a portion of the vessel circumference (minimum plaque thickness < 0.75 mm) were classified as eccentric. Other variables quantified by ultrasound included the presence and arc (in degrees) of vessel wall calcification.

Results: Angiographic lesion eccentricity and/or calcification did not correlate with percentage of plaque removed. The presence of ultrasound calcium decreased the percentage of plaque removed from 24.2% to 13.6%, $p = 0.05$. The arc of ultrasound calcification correlated inversely with plaque removal, $r = 0.55$. Most importantly:

Ultrasound Plaque Distribution	Concentric Lesions	Eccentric Lesions	p value
Plaque Removed (mm^2)	4.66	2.43	0.003
Plaque Removed (%)	29.9	18.7	0.02
Adjunctive Balloon	56%	81%	0.05

Conclusions: Contrary to current doctrine, atherectomy achieves better plaque removal and requires adjunctive balloon less often in lesions with concentric, rather than eccentric, atheromata. Ultrasound target lesion calcification is a negative predictor of plaque removal.